

Flood hazards in Nigerian cities, the Kaduna case study

A. W. ALAYANDE & O. A. BAMGBOYE

National Water Resources Institute, PMB 2309, Kaduna, Nigeria
walayande@yahoo.co.uk

The lack of river training and flood protection structures coupled with improper flood-plain management have led to colossal loss of life and property in Nigerian cities with large rivers passing through them. Such losses have arisen from population growth, urbanization and expansion of structural developments into flood-prone areas of the cities. In this study, rainfall and streamflow data were collected and analysed for extreme events in the Kaduna River basin: the geomorphic characteristics of the river channel and flood plain were determined; the St Venant hydraulic model was used to predict the extent of inundation of the flood plain from floods of various frequencies; and the socio-economic implications of each of the scenarios were determined. The study indicated that the Kaduna flood plain was indiscriminately developed, with no flood warning systems in place. Flood hazard zones were predicted to enclose existing utilities and residential developments, while some areas are susceptible to flash floods during the rainy season. Infrastructural developments along the Kaduna flood plain should be regulated as a short-term measure, and the construction of dykes along the banks should shield the already-developed area from flood water as a long-term measure. Integrated flood-plain management strategies and tools were proposed for implementation by existing institutions, who should act appropriately within existing legal frameworks to regulate and manage developments within the flood plains in cities across Nigeria with similar situations.

REFERENCES

- Alayande, A. W. (2010) Modeling the impacts of urbanization on river flooding. PhD Thesis, Department of Civil Engineering, University of Nsukka, Nsukka, Nigeria.
- NWRI (2008) The Gusau 2006 Flood Studies. A research work by the Land and Water Division, National Water Resources Institute, Kaduna, Nigeria.
- USACE (1993) *River Hydraulics Engineers Manual 110-2-1416*, 15 October. US Army Corps of Engineers, Washington DC, USA.